

ECE 343: Signals and Systems

Instructor

Jonathan Kotta: 701-232-0661 x4424 (work), 701-306-9269 (cell), jpkotta@gmail.com

Text

B.P. Lathi, *Linear Systems and Signals*, 2nd ed. Oxford University Press, 2005. ISBN 0-19-515833-4.

Other Texts

David W. Kammler, *A first course in Fourier analysis*. Prentice Hall, 2000. ISBN 0-13-578782-3.

Simon Haykin and Barry Van Veen, *Signals and Systems*. John Wiley & Sons, Inc., 1999. ISBN 0-471-13820-7.

Office Hours

TBD (probably after class). Also, Tuesdays will most likely be recitation sessions.

Grading

Homework	25%
Tests (3)	50%
Final	25%

I will try to assign homework fairly often - about once a week. I will make solutions available after homework has been turned in, thus no late work will be accepted. Assume that neither calculators nor notes will be allowed during exams.

Outline

Review and Introduction

complex numbers and arithmetic; vector spaces and linear algebra; Calculus, algebra, and rational functions; circuits and digital systems; general signals and systems

Fourier Transforms

vector spaces and inner product spaces; minimum mean squared error; Fourier transforms on \mathbb{R} , \mathbb{T}_p (Fourier series), \mathbb{Z} (discrete-time Fourier transform), and \mathbb{Z}_N (discrete Fourier transform); Fourier transform calculus

Z transforms

difference equations; bilateral and unilateral Z transforms; regions of convergence; signal and system properties; poles and zeros; relation to Fourier transforms

Laplace transforms

differential equations; bilateral and unilateral Laplace transforms; regions of convergence; signal and system properties; poles and zeros; relation to Z and Fourier transforms

Sampling Theory (time permitting)

Poisson summation and relations between Fourier transforms on different spaces; sampling and reconstruction